WHAT IS CLAIMED IS:

1. A solid-state imaging device comprising a plurality of two-dimensionally arranged photo diodes and a plurality of microlenses having substantially hemispherical shapes which cover the respective photo diodes,

the microlens comprising a multilayer structure lens including at least

a transparent resin upper layer which forms at least a portion of the substantially hemispherical shape, and

a colored lower layer provided on a portion of the transparent resin upper layer, which is located above the photo diode, with an interface between the colored lower layer and the transparent resin upper layer having a shape conforming to a surface of the photo diode.

2. A solid-state imaging device according to claim 1, wherein the interface between the transparent resin upper layer and the colored lower layer is flat.

3. A solid-state imaging device according to claim 1, wherein a portion of the colored lower layer forms at least a portion of the substantially hemispherical shape.

4. A solid-state imaging device according to claim 1, wherein the colored lower layer comprises a colored resin layer containing a dye as a coloring

material.

5. A solid-state imaging device according to claim 1, wherein a thickness difference between said plurality of colored lower layers is not more than 0.3 µm.

6. A solid-state imaging device according to claim 1, wherein a refractive index of the transparent resin upper layer is not more than that of the colored lower layer.

7. A solid-state imaging device according to claim 1, which further comprises a planarized layer provided between the microlens and the photo diode, and

in which at least one of the microlens and the planarized layer has an infrared absorbing function.

8. A solid-state imaging device according to claim 7, further comprising an ultraviolet absorbing layer provided between the planarized layer and the colored lower layer.

9. A solid-state imaging device according to claim 8, wherein the planarized layer has an ultraviolet absorbing function.

10. A solid-state imaging device according to claim 3, wherein the microlens further comprises a lens matrix which is provided on the transparent resin upper layer and forms at least a portion of the substantially hemispherical shape.

11. A solid-state imaging device according to

claim 3, wherein a value obtained by subtracting a thickness T1 of a portion of the colored lower layer from a thickness T of the colored lower layer is not less than 0.4 μm.

12. A solid-state imaging device according to claim 10, wherein a thickness T1 of a portion of the colored lower layer which forms at least a portion of the substantially hemispherical shape satisfies a condition $0.02T \leqq T1 \leqq 0.5T$ where T is a thickness of the colored lower layer.

13. A solid-state imaging device according to claim 1, wherein a material for the planarized layer comprises a resin which has a transmittance of not more than 40% at an exposure wavelength and also has a transmittance of not less than 90% in a visible range.

14. A solid-state imaging device according to claim 3, wherein a refractive index of the transparent resin upper layer is lower than that of the colored lower layer.

15. A solid-state imaging device according to claim 14, further comprising an outer resin layer which has a lower refractive index than the colored lower layer and covers a portion of the colored lower layer which forms at least a portion of the substantially hemispherical shape.

16. A solid-state imaging device according to

claim 14, wherein the transparent resin upper layer comprises a fluorine-based acrylic resin.

17. A solid-state imaging device according to claim 1, which further comprises non-opening portion layers which cover non-opening areas existing between said plurality of microlenses, and

in which at least one of the transparent resin upper layer and the thin film is made of a fluorine-based acrylic resin.

18. A solid-state imaging device manufacturing method for a solid-state imaging device comprising a plurality of two-dimensionally arranged photo diodes and a plurality of microlenses having substantially hemispherical shapes which cover the respective photo diodes, comprising:

forming a planarized layer on a plurality of photo diodes two-dimensionally arranged on a semiconductor substrate;

forming colored lower layers in a plurality of colors on the planarized layer by photolithography using photosensitive colored resists containing coloring matters as coloring materials;

forming transparent resin upper layers on said plurality of colored lower layers by coating a first resin coating solution;

forming a lens matrix on the transparent resin upper layer by photolithography and annealing using

a lens material having alkali solubility, photosensitivity, and heat flow properties; and

transferring a pattern of the lens matrix onto at least the transparent resin upper layer by performing dry etching on the lens matrix, and forming the microlens having at least the transparent resin upper layer and the colored lower layer.

19. A solid-state imaging device manufacturing method according to claim 18, further comprising forming a thin transparent resin layer so as to cover an entire surface of a two-dimensional array of the lens matrices after formation of the lens matrices.

20. A solid-state imaging device manufacturing method according to claim 19, wherein a depth of the dry etching in transfer of the lens matrix pattern corresponds to a portion of the colored lower layer in a direction of thickness.

21. A solid-state imaging device manufacturing method according to claim 18, wherein a gas used for the dry etching comprises a gas including at least one of CF_4, C_2F_6, C_3F_8, C_4F_8, CHF_3, and C_2HF_5 which are freon-based gases.

22. A solid-state imaging device manufacturing method according to claim 18, wherein the coloring matter comprises a dye.

23. A solid-state imaging device manufacturing method according to claim 18, wherein the planarized

layer is made to have an infrared absorbing function by using a resin coating solution having an infrared absorbing function in forming the planarized layer.

24. A solid-state imaging device manufacturing method according to claim 18, wherein the transparent resin upper layer is made to have an infrared absorbing function by using a resin coating solution having an infrared absorbing function in forming the transparent resin upper layer.

25. A solid-state imaging device manufacturing method according to claim 23 or 24, wherein the resin coating solution contains a plurality of infrared absorbing agents having different infrared absorption wavelength ranges.

26. A solid-state imaging device manufacturing method according to claim 18, further comprising forming an ultraviolet absorbing layer by coating between formation of the transparent resin upper layer and formation of the lens matrix.

27. A solid-state imaging device manufacturing method according to claim 18, further comprising stacking a thin infrared absorbing layer on the microlens by coating after the lens matrix pattern is transferred onto at least the transparent resin upper layer.

28. A solid-state imaging device manufacturing method according to claim 18, further comprising

stacking a thin low refractive index resin film on an outermost layer of the microlens.

29. A solid-state imaging device manufacturing method according to claim 18, wherein as a material for the planarized layer, a resin which has a transmittance of not more than 40% at an exposure wavelength and also has a transmittance of not less than 90% in a visible range is used.

30. A solid-state imaging device manufacturing method according to claim 18, wherein a refractive index of the transparent resin upper layer is lower than that of the colored lower layer.

31. A solid-state imaging device manufacturing method according to claim 18, further comprising forming a thin transparent resin film having a lower refractive index than the colored lower layer so as to cover an entire surface of the microlens by using a second resin coating solution after the lens matrix pattern is transferred.

32. A solid-state imaging device manufacturing method according to claim 31, wherein at least one of the first resin coating solution and the second resin coating solution comprises a resin coating solution containing a fluorine-based acrylic resin.

33. A solid-state imaging device manufacturing method according to claim 18, which further comprises forming a photosensitive layer on the transparent resin

upper layer by using a photosensitive resin solution having heat flow properties, instead of forming the lens matrix, after the transparent resin upper layer is formed, forming a lens pattern by performing a patterning process including pattern exposure and development for at least the photosensitive layer, and forming substantially hemispherical lens matrices at the respective positions of light-receiving elements arranged in the form of an array by heat flow, and

in which in transferring the lens matrix pattern, the lens matrix pattern is transferred onto at least the transparent resin upper layer and the lens matrices.

34. A solid-state imaging device manufacturing method according to claim 18, further comprising forming a thin fluorine-based acrylic resin film which covers non-opening portions existing between said plurality of microlenses.

35. A solid-state imaging device manufacturing method according to claim 18, wherein

the first resin coating solution comprises a fluorine-based acrylic resin, and

in dry etching on the lens matrices, a lens matrix pattern is transferred onto the transparent resin layer, the transparent resin layers of the colored lower layers in said plurality of colors are formed into microlenses, and non-opening portion layers made

of the fluorine-based acrylic resin are formed on the non-opening portions between the microlenses.